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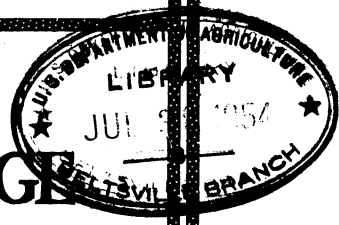
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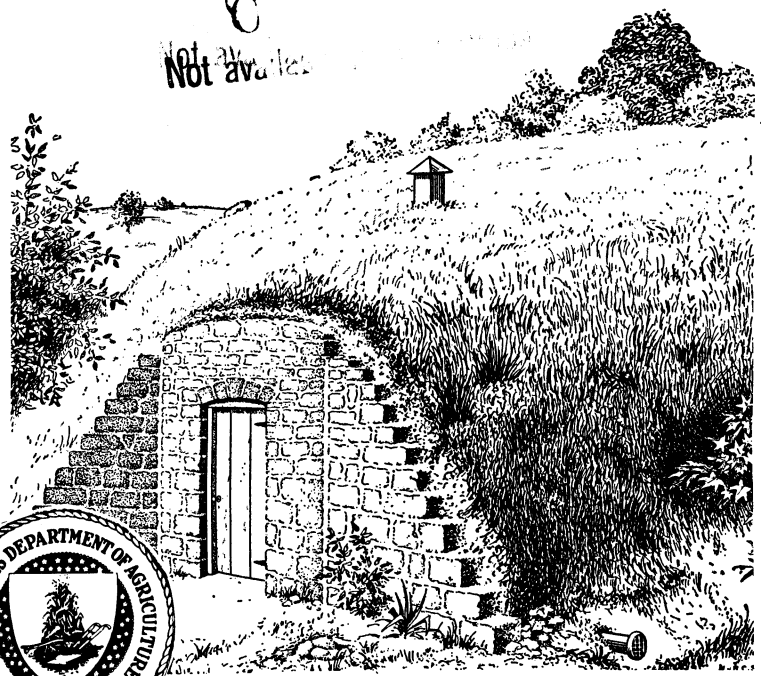
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FARMERS' BULLETIN No. 879



HOME STORAGE  
OF VEGETABLES

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**T**HE STORING of late vegetables is an economy for those who grow them in sufficient quantity for the needs of the family.

To care for the surplus vegetables in many cases requires nothing more than the use of existing facilities in or near the home.

Often the late vegetables from a small garden may be stored with no outlay of money.

When considerable quantities of vegetables are grown it is frequently advisable to construct permanent storage facilities in the form of a storage room in the basement of the dwelling or under an outbuilding or to build an outdoor cellar of wood or masonry.

If permanent facilities are not available late root crops can be kept in outdoor pits or banks, requiring no cash outlay except for labor.

# HOME STORAGE OF VEGETABLES.

By JAMES H. BEATTIE, *senior horticulturist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry.*

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## REASONS FOR STORING VEGETABLES.

FOR THOSE PERSONS who are fortunate enough to control land for the growing of vegetables in sufficient quantity for the needs of the family, storage will prove an economy. Likewise, it will often prove an economy to grow late vegetables to store. Home storage is of importance at all times, but especially so if vegetables are scarce and prices are high. Crops of suitable sorts that mature at a season when they can be preserved by storing should be kept in their natural condition instead of being canned or dried. Not only is it possible to reduce the cost of the menu materially by growing and storing vegetables for home use, but the satisfaction and dietary advantage of having a supply of fresh vegetables near at hand, so that regardless of markets and winter temperatures the list may be varied, cannot be measured in dollars and cents.

A half-acre garden, if cared for properly, will produce far more vegetables than the average family can consume during the maturing period of the crops. Only a small portion of the garden should be devoted to those vegetables which must be used as soon as they reach maturity. Beets, late cabbage, carrots, celery, onions, parsnips,

potatoes, sweet potatoes, salsify, and turnips may be stored in their natural condition, and should be grown to the extent of the family needs for storage for winter use. Beans of various kinds, including the limas, may be stored dry. The successful storage of vegetables is not at all difficult; in fact, good storage facilities already exist in most homes, it being only necessary to make use of the cellar, the attic, a large closet, or other parts of the dwelling, depending upon the character of the product to be stored, and to take reasonable care to discard all individual vegetables showing any decay or mechanical injury before putting them into storage.

Different vegetables require different storage conditions; as a rule vegetables dry out or wilt or wither rather quickly unless the atmosphere of their storage place is kept damp and the temperature as low

as possible without actual freezing. Certain vegetables, however, furnish exceptions to this rule, as will be noted later.

Some attention will necessarily have to be given to ventilation. Ventilation is needed in a storage space not only to change the air to carry off odors but also to help obtain a desirable storage temperature and humidity. Advantage should always be

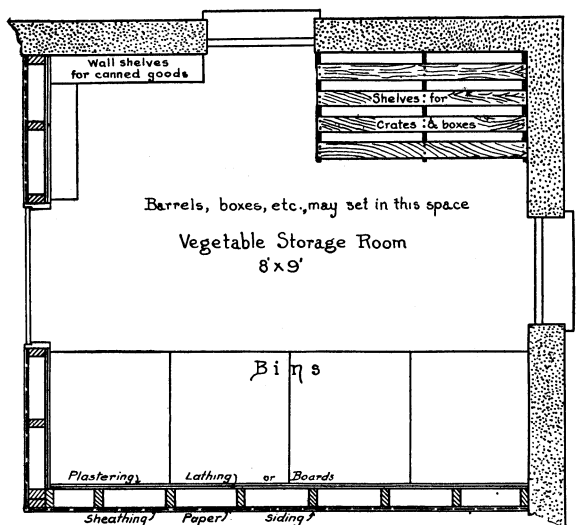


FIG. 1.—Floor plan of a storage room in a corner of a basement. The arrangement of the shelving and bins may be changed to suit conditions. While the construction of the wall may be varied, it must be tight.

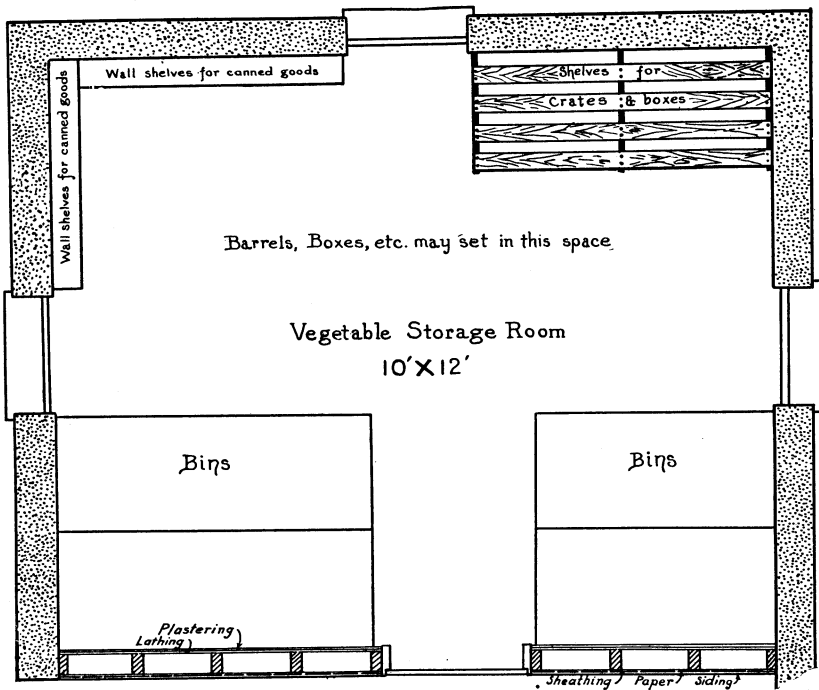
at night and at other times when the outside temperature is near but not below freezing and the air is not too dry.

## TYPES OF STORAGE.

### A STORAGE ROOM IN THE BASEMENT OF THE DWELLING.

A cool, well-ventilated cellar under the dwelling offers good conditions for the storage of vegetables. Many cellars are not well

suited for storing vegetables because of poor insulation or lack of ventilation. Cellars containing a furnace for heating the dwelling usually are too warm and too dry for the storage of root crops. It is often possible, however, to partition off a room either in one corner or at one end of the cellar where the temperature may be controlled by means of outside windows. At least one window is necessary, and two or more are desirable for admitting light and for ventilation. If the cellar is square or rectangular, a room similar to the one illustrated in figure 1 can be arranged. If, as is often



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FIG. 2.—Floor plan, showing the possibility of constructing a storage room by partitioning off the portion of the cellar under the wing of the house.

the case, however, the cellar is built in the shape of an ell, the room should be made by partitioning off the offset, as shown in figure 2. In some cases it is possible to cut off one end of the cellar with one straight wall.

#### CONSTRUCTION OF THE STORAGE ROOM.

The size of the storage room should be determined by the space available and the amount of material to be stored. Natural earth makes a better floor than concrete or brick, as a certain amount of

moisture is desirable. The walls of the storage room should be parallel to the walls of the cellar. Lay 2 by 4 inch scantling flat on the floor and secure them with pegs driven into the floor or by nailing them to the top of short posts set in the ground. Set 2 by 4 inch studding from this sill to the ceiling, spacing them 16 inches apart from center to center. Locate the door to the storage room at the most convenient point, making it large enough to admit barrels, boxes, etc., a good size being 2½ feet wide by 6½ feet high. Set the studs on either side of the door 32 inches apart, which will allow for the door and the frame. Put a header over the door, allowing 1 inch

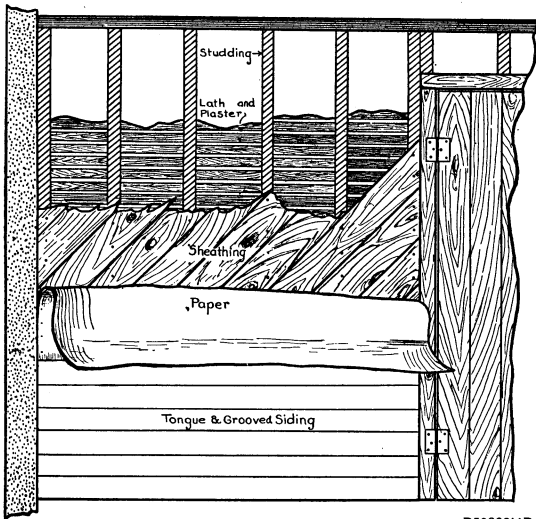


FIG. 3.—Wall of a storage room in a basement, showing the details of construction. This type of construction is good, but a satisfactory room can be made by omitting the laths and plaster. Many rooms with studding frame and tongue-and-groove siding give excellent results.

for the frame and seven-eighths of an inch for the sill at the bottom. Set the studs against the walls where the cellar walls and storage-room walls meet. Care exercised in making the frame square and plumb will enable the builder to get the structure tight with a minimum of labor. A good room is made by covering the studding on the outside with tongue - and - groove material, but a better way is to sheathe

the outside with plain lumber, tack building paper on this, and side with tongue-and-groove material. This construction in connection with lath and plaster or wall board on the inside makes an excellent room. The construction of such a wall is illustrated in figure 3.

Ventilation may be secured by opening one or more windows. An air duct constructed of wood, metal, or terra cotta and fitted in one of the windows, as illustrated in figure 4, is desirable, as it permits the cool air to enter at the bottom of the room. Two or more joints of 6-inch stovepipe, one with a damper, and an elbow may be used. A piece of board with a hole the size of the pipe is fitted in the

window in place of one of the panes of glass. Another pane of glass may be removed from the sash and a small hinged door fitted in its place, which when open allows the heated air to escape. In cold weather both the hinged door and the damper in the stovepipe must be closed. The windows in the storage room should be darkened in order to protect the vegetables from the light.

Barrels, crates, boxes, or bins may be used as containers for the various vegetables, but movable containers are preferable to built-in

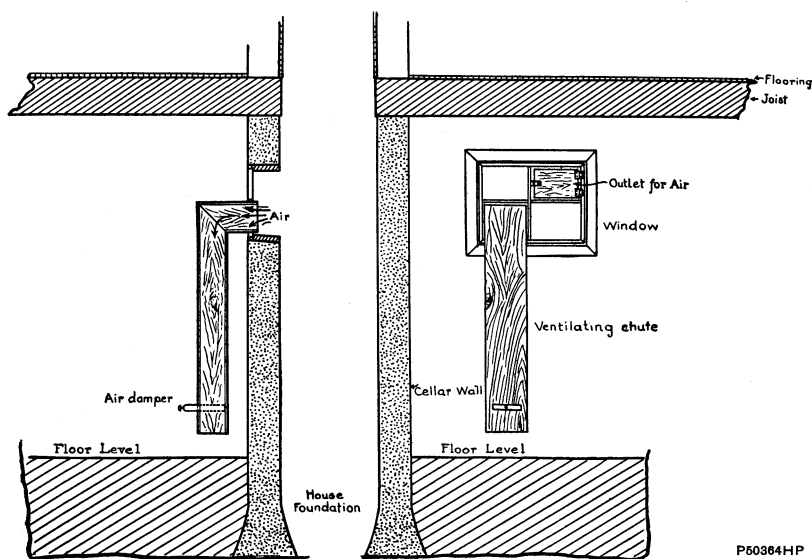


FIG. 4.—Details of construction for the ventilation of a storage room in a basement. The air duct may be made of wood, terra cotta, or metal and installed in place of a pane of glass, thus avoiding cutting through the cellar wall. A hinged door the size of another pane of glass may serve as an outlet for the warm air.

bins, as it is possible to remove them for cleaning. It is advisable to construct shelves or a slat floor to keep the crates, boxes, baskets, and other containers off the ground. This is highly desirable to insure a free circulation of air and to prevent the containers from harboring mice, rats, and other vermin. The shelves for canned goods along one side of the room need not be more than 6 inches wide. A suggested arrangement for the bins, shelves, etc., in the storage room is shown in figures 1 and 2.

#### OUTDOOR STORAGE CELLARS.

Outdoor storage cellars or caves are excellent for the storage of many vegetables. They are particularly desirable on the farm, as



they afford convenient and inexpensive storage facilities for surplus vegetable crops that otherwise might be lost. They possess all the advantages of the storage room in the basement and are superior in many respects. The outdoor storage cellar can be maintained at a uniform temperature over a long period. It is possible to keep the cellar cool and quickly to reduce the temperature of the stored product to the desired point for safe storage by opening the door during the night and closing it in the morning before the air becomes warm. All ventilators should likewise be kept tightly closed until the outside air is again cooler than that within the cellar, when they should be opened, unless the outside temperature is so low as to be dangerous. This safeguards the product and adds to the efficiency of the storage chamber. Vegetables can be more conveniently placed in such a cellar than in the storage room in the basement of a dwelling.

When the chief use of the outdoor storage cellar is for storing turnips, beets, carrots, and other root crops commonly used as stock food, it should be located near the stable, where the material will be convenient for winter feeding. When it is to be used for vegetables for the table the cellar should be accessible from the kitchen at all times. If apples or other fruits are to be stored in an outdoor storage cellar it is desirable to have a two-compartment cellar, one for vegetables and one for apples, with a ventilating apparatus in each compartment.

#### CONSTRUCTION OF THE OUTDOOR STORAGE CELLAR.

As the root cellar must be weatherproof, that is, capable of being kept free from moisture and free from frost, its type and construction vary with the geographical location. In the southern portion of the country the structure is usually entirely above ground and protected by only a few inches of sod and with straw, leaves, etc. In northern sections outdoor storage cellars are made almost entirely below ground and covered with a foot or two of earth.

#### STORAGE IN REGIONS OF MILD WINTERS.

An aboveground storage cellar suited to conditions in southern sections of the United States may be built on a well-drained site at slight expense. A row of posts may be set 5 or 6 feet apart, extending 7 or 8 feet above the surface of the ground, with a ridge-pole placed on top of them. Against each side of the ridgepole



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FIG. 5.—An outdoor storage cellar, typical of those used in the South for storing sweet potatoes and other root crops. It consists of a pole and plank frame covered with sod and straw.

a row of planks or puncheons is placed, with their opposite ends resting in a shallow trench 4 or 5 feet from the line of posts. The ends are boarded up, a door being provided in one end of the structure, and the roof covered with sod to a depth of 5 or 6 inches. A good type of outdoor storage cellar built along these lines is shown in figure 5.

#### STORAGE IN REGIONS OF SEVERE FREEZES.

In sections where low temperatures prevail it is necessary to insulate the storage house so that the vegetables will not freeze. An aboveground type of storage house much used in many sections of the North has thick walls filled with insulating material, such as sawdust or shavings. The construction is of frame and the walls are usually 10 to 12 inches thick. Both the inside and the outside walls are sheathed with matched lumber so as to make them airtight. The rafters are ceiled on the under side with the same material and the space between the rafters filled with dry insulating material. The use of building paper in the roof and walls of the storage house is of great assistance in insulating it. Ventilation is provided in the same manner as in the outdoor storage cellar built of concrete described on page 11.

A type of storage cellar much used in northern sections of the country is built partly under ground. The walls are of masonry and

extend to a point just above the surface of the ground. On these walls plates are set and a roof of frame construction erected. The roof structure is ceiled on the under side of the rafters and some suitable insulating material, such as dry sawdust or shavings, packed in the space between the rafters, and then the sheathing, paper, and roofing material are applied as in the case of the aboveground type of storage cellar described in the previous paragraph. This type of structure (fig. 6) is preferable in many respects to the aboveground type, as it is easier to maintain the temperature at the proper point and its insulation is a comparatively easy matter.

Protection from freezing may be secured with a simpler type of structure (figs. 7 and 8) by making it entirely under ground. In order to avoid steps down to the level of the floor, with the consequent extra labor in storing and removing the vegetables, a sidchill location is desirable.

The excavation in the hill should be of the approximate size of the cellar, using the dirt for covering the roof and for banking the sides of the structure. A frame is erected by setting two rows of posts of uniform height in the bottom of the pit near the dirt walls and a third line of posts about 5 feet higher through the center of the pit. These posts serve as supports for the planks or puncheons forming the roof of the structure, as with the aboveground type of storage cellar already described. The door is placed at one end and a ventilator put in the roof. The whole structure with the exception of the



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FIG. 6.—A storage cellar typical of those much used in the northern sections of the country, consisting of masonry walls and a well-insulated wooden roof.

portion occupied by the door is covered with dirt and sod. The thickness of the covering must be determined by the location; the colder the climate the thicker the covering. The dirt covering may be supplemented in winter by a layer of manure, straw, corn fodder, etc. Outdoor storage cellars usually are left with dirt floors, as a certain degree of moisture is desirable. These cellars may also be made of concrete, brick, hollow tile, stone, or other material.

#### OUTDOOR STORAGE CELLARS BUILT OF CONCRETE.

The type of outdoor storage cellar described above, while low in first cost, is short lived, as the conditions in the cellar are favorable to the decay of wood.

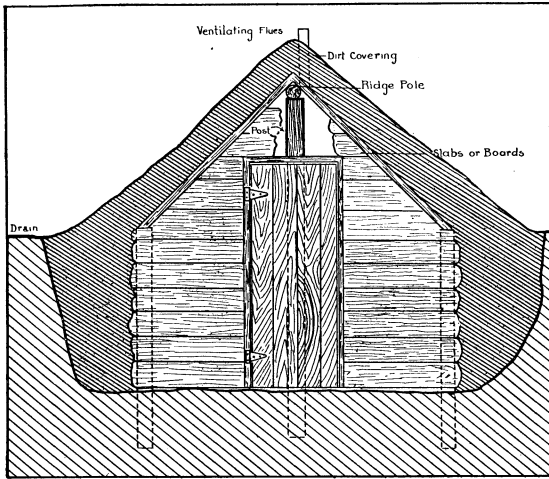


FIG. 7.—End view of an outdoor storage cellar, showing the frame of posts covered with planks or puncheons and with dirt. Additional protection may be given by placing manure, straw, or corn fodder on top of the dirt.

The concrete storage cellar, although rather high in first cost, as compared with wood, is a permanent structure. Concrete possesses several advantages over brick, stone, or other decay-resisting materials. In the construction of a small structure suitable for the home it is possible to make the roof self-supporting and to employ unskilled labor, thus lessening the cost. It

is a simple matter to waterproof concrete, a feature highly desirable in a storage cellar.

For detailed information in reference to the mixing and handling of concrete, the reader is referred to *Farmers' Bulletin 1772*, entitled "Use of Concrete on the Farm."

The site for the concrete storage cellar should be selected with the same considerations in mind as for the wood-frame cellar, namely, a well-drained, convenient location, preferably a sidehill, into which it may be built, as shown in figures 9 and 10. The excavation should be just large enough for the dirt walls to serve as the outside form for the concrete. For that portion of the wall which is above the surface of the ground a board form must be used. The inside form usually is made of boards held in place by scantling spaced about 18 inches apart. Temporary supports should be placed across the top to carry the form, so that it will be of the size and shape desired. The side

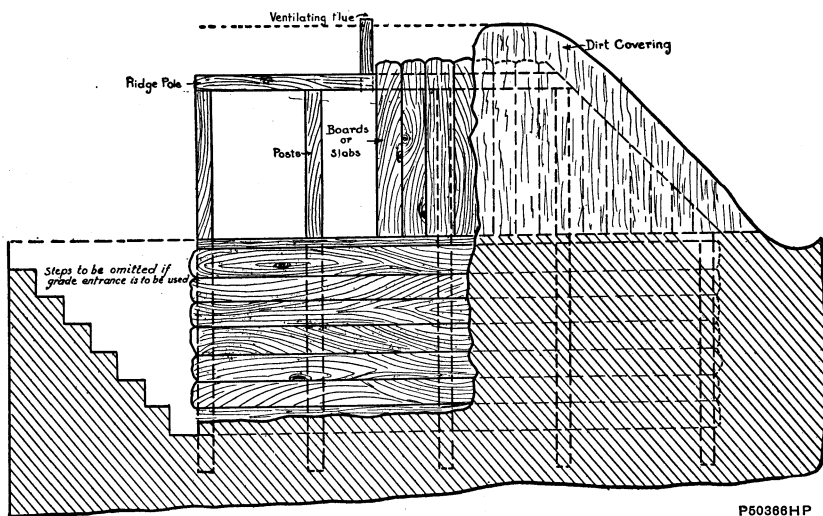


FIG. 8.—Side view of an outdoor storage cellar, showing the details of construction. If the cellar is more than 12 feet long, two ventilating flues should be used. If built on a sidehill, no steps will be needed, making it easier to store and remove the vegetables.

walls and roof should be so constructed that there will be no joints to weaken the structure. The form for the ceiling may be slightly arched by setting a temporary line of posts through the middle of the excavation. A plate placed on these posts a few inches higher than the height of the side walls will allow the form boards to be laid crosswise of the cellar, springing the ends down and securing

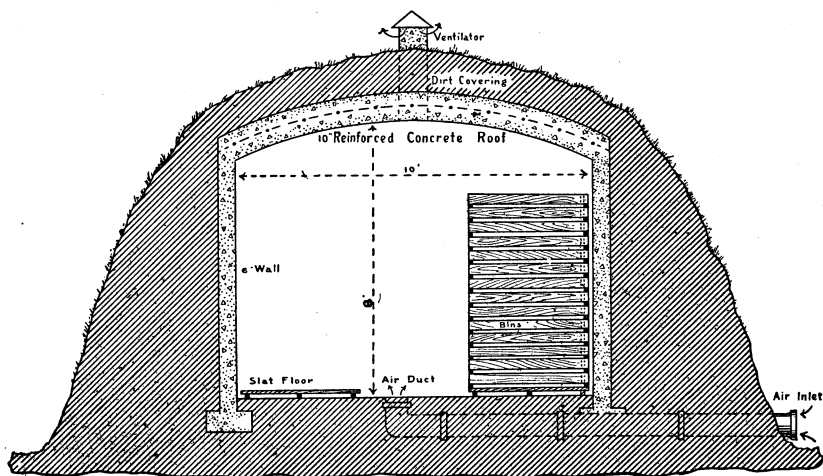


FIG. 9.—Cross section of a concrete storage cellar, showing the arrangement of ventilators, slat floors, and bins, with provision for the circulation of air under and around the slat floors and bins. This cellar is 10 feet wide and 8 feet high, inside measurement.

them to the forms for the inside of the walls. An arch a few inches high makes a strong roof and helps in ventilating the cellar.

The whole structure, with the exception of the portion occupied by the door, is covered with earth to prevent freezing, the thickness of the earth covering depending upon the geographical location. In the colder sections of the country 2 or 3 feet is not too much, and additional protection may be given by using a supplementary covering of straw, fodder, or manure. In severely cold weather both the top and bottom air ducts must be closed. It is well to cover the outside ends of the air inlets by woven wire in order to prevent small animals from entering the storage cellar.

The cellar illustrated in figures 9, 10, and 11 is 10 feet wide, 12 feet long, and 8 feet high and will contain the products of an acre

garden. The walls are of 6-inch concrete reinforced by five-eighths-inch iron rods. The floor is earth, as this permits good moisture conditions for the storage of vegetables. The structure is provided with a ventilating flue in the roof and an air inlet in the floor for the admission of cool air.

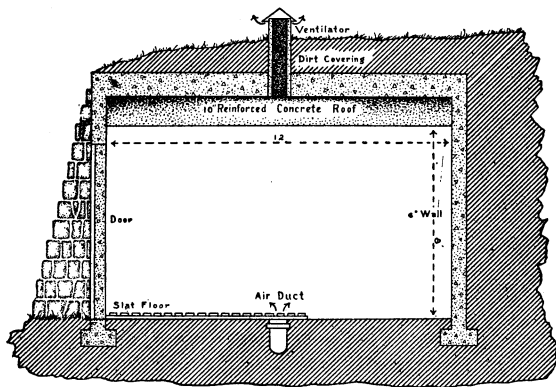


FIG. 10.—Longitudinal section of an outdoor storage cellar 12 feet long, built of concrete. The structure may be lengthened to increase the storage capacity, but if this is done additional ventilators must be provided.

garden. The walls are of 6-inch concrete reinforced by five-eighths-inch iron rods. The floor is earth, as this permits good moisture conditions for the storage of vegetables. The structure is provided with a ventilating flue in the roof and an air inlet in the floor for the admission of cool air. The storage capacity may be increased by making the structure longer, but when this is done additional ventilators must be provided. If the width is increased, either middle piers should be used to assist in carrying the roof or the roof should be arched. A cellar 6 feet wide, 8 feet long, and 7 feet high will provide the necessary storage space for the products of a small home garden and may be built in the same manner as the one illustrated in figures 9, 10, and 11.

#### THE STORAGE CELLAR UNDER AN OUTBUILDING.

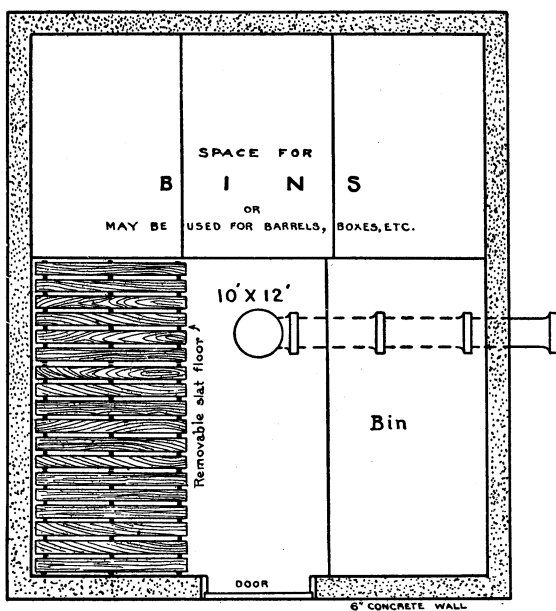
Sometimes it is possible to build a storage cellar as the lower story of and foundation for an outbuilding. When this is done it is desirable to have the cellar almost entirely under ground and well insulated by banking the outside walls with dirt. The ceiling of the

cellar may be made frostproof by constructing a double wall to be filled with dry sawdust, shavings, or other insulating material. Concrete is a good material of which to construct the side walls of the cellar, although brick, stone, tile, etc., may be used. The entrance may be through the floor of the room above or through an outside door placed in one end of the cellar, reached by steps or a grade entrance. Ventilation may be secured by placing a shaft from the ceiling of the cellar through the room above to the roof, or by placing the ventilators in the side walls near the ceiling. The inlet ducts should be put in the floor as in other outdoor concrete cellars and their outer ends covered with wire screen.

#### STORAGE IN BANKS OR PITS.

Outdoor banks or pits are used very generally for keeping vegetables. The conical pit is used commonly for such vegetables as potatoes, carrots, beets, turnips, salsify, parsnips, and heads of cabbage and is constructed as follows: A well-drained location should be chosen and the product piled on the surface of the ground; or a shallow excavation may be made of suitable size and 6 or 8 inches

deep, which may be lined with straw, leaves, or similar material and the vegetables placed on the litter in a conical pile. The vegetables should then be covered with straw or similar material and finally with earth to a depth of 2 or 3 inches. As winter approaches, the dirt covering should be increased until it is several inches thick. The depth of the earth covering is determined by the severity of the winters in the particular locality. It is well to cover the pits with straw, corn fodder, or manure during severely cold weather.



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FIG. 11.—Floor plan of a simple concrete storage cellar which may be used for potatoes, beets, carrots, turnips, rutabagas, cabbage, celery, and apples. The floor is of dirt, but the barrels, crates, etc., used as containers for the vegetables, are set on a slat floor. Bins decay so quickly that barrels, boxes, etc., are usually preferable.

The amount of ventilation necessary will depend upon the size of the pit. Small pits containing but a few bushels of vegetables will receive sufficient ventilation if the straw between the vegetables and dirt is allowed to extend through the dirt at the apex of the pile. This should be covered with a board or piece of tin held in place by a stone to protect it from rain. In larger pits ventilation may be secured by placing two or three pieces of rough boards or stakes up through the center of the pile of vegetables so that a flue is formed. This flue is capped by a trough formed of two pieces of board nailed together at right angles, as illustrated in figure 12.

Vegetables keep very well in such pits, but it is difficult to get them out in cold weather, so that when a pit is opened it is desirable



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FIG. 12.—Banks or pits ventilated by a flue formed of two or three pieces of board or poles capped with a trough made by nailing two pieces of board together at right angles. Banks of this kind are used for the storage of potatoes, carrots, beets, turnips, salsify, parsnips, and cabbage.

to remove its entire contents at once. For this reason it is advisable to construct several small pits rather than one large one, and instead of storing each crop in a pit by itself it is better to place a small quantity of several kinds of vegetables in the same pit, so that it will be necessary to open only one bank to get a supply of all of them. In storing several crops in the same bank it is a good plan to separate them with straw, leaves, or other material. The vegetables from the small pit may be placed temporarily in the storage room in the basement, where they will be easily accessible as needed for the table.

The construction of the storage bank or pit is illustrated in figures 13 and 14, figure 13 showing the cross section of a storage pit containing Irish potatoes and figure 14 one containing sweet potatoes.



## STORAGE OF VARIOUS VEGETABLES.

## BEANS AND PEAS.

Beans may be kept for winter use by picking the pods as soon as they are mature and spreading them in a warm, dry place, such as an attic floor, until the beans are thoroughly dry. Then shell and store in bags hung in a dry, well-ventilated place until needed. Do not store beans in the cellar as cellars are likely to be too damp. Allow navy and other bush beans to mature on the vines until a maximum number of pods are ripe; then pull the whole plant and cure it like hay. After thorough drying, thrash the beans and store as suggested above.

Peas may be treated like bush beans and stored in the same manner.

## LATE BEETS.

Storage for beets may be of any of the types described. The beets should be pulled and the tops cut off when the soil is dry. If they

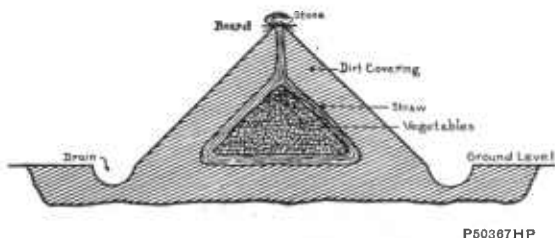


FIG. 13.—Cross section of a storage pit containing Irish potatoes. During severely cold weather the dirt covering may be supplemented by manure, straw, etc.



FIG. 14.—A bank of sweet potatoes being covered with dry cane tops. Corn fodder, straw, leaves, or similar material might have been used.

are to be held in the storage room in the basement or in an outdoor storage cellar, they should be placed in ventilated barrels, loose boxes, or, better still, in crates. If sufficient space is available in the cellar, it is a good plan simply to place them in small piles along

the wall. Storage in large piles should be avoided, as it is liable to cause heating and decay. Beets dry out and wilt very rapidly if kept too dry.

For storage in banks or pits prepare the beets as for storage in the room in the basement or in the outdoor cellar. Select a well-drained location, make a shallow excavation, about 6 inches deep, line it with straw, hay, leaves, or similar material, and place the beets in a conical pile on the lining. Make the bottom of the pile about the same size as but not larger than the bottom of the excavation. Cover the beets with the same material as that used for lining the bottom of the pit, and carry it up several inches above the apex of the pile of vegetables, having it extend through the dirt covering. This serves as a ventilating flue, and it should be covered with a piece of tin or a short board as a protection from rain. The dirt covering should be 2 or 3 inches thick when the vegetables are stored, and it should be increased as severely cold weather approaches until it is a foot or more in thickness. In finishing the pit the dirt should

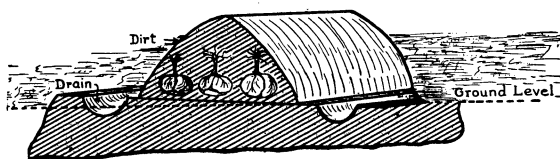


FIG. 15.—Cabbages stored in long banks. Good drainage is essential, but the dirt covering need not be as thick as for vegetables that are easily injured by frost.

be firmed with the back of the shovel in order to make it as nearly waterproof as possible.

The shallow trench around the base of the pit should have an outlet for carry-

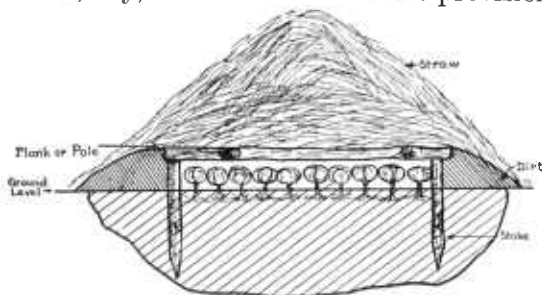
ing off the water. Supplement the dirt covering with manure, straw, corn fodder, or other protecting material. Use several small pits instead of one large one, as vegetables keep better in small pits and the entire contents may be removed when the pit is opened.

#### LATE CABBAGES.

Heads of late cabbage may be cut and stored in conical pits in the same manner as beets. Another common and very satisfactory method is to pull the plants, roots and all, and place them in a long pit with the heads down, as illustrated in figure 15. A few heads may be removed from time to time without disturbing the remainder of the pit. As slight freezing does not injure the cabbage, the covering of the pit need not be as thick as for other vegetables.

Another good method of storing cabbage is illustrated in figure 16. The plants are pulled, roots and all, and set side by side with the roots down in a shallow trench, the length of which corresponds to the width of the bed. The bed may be any width up to 8 or 10 feet and as long as necessary to hold the number of cabbages to be stored. Cover the roots with earth. Around the bed erect a

frame of rails, boards, or poles, or by driving a row of stakes into the ground so that an inclosure about 2 feet in height is formed. Bank the outside of this frame with dirt and place poles across the top, covering them with straw, hay, or corn fodder. Make provision for removing portions of the stored product from one end of the pit. This type of storage is inexpensive and gives good results. When the heads are cut, leave the roots in position, and in the spring these roots will sprout and supply the family with an abundance of greens.



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FIG. 16.—Cross section of a cabbage storage pen made of stakes and poles and covered with straw. This is a good way to store cabbage.

Heads of cabbage may be laid in rows on shelves in an outdoor storage cellar, as shown in figure 17, but not in a storage room in the basement of a dwelling, as the odor is likely to penetrate through the house.



P465HP

FIG. 17.—Heads of cabbage stored on shelves in an outdoor cellar. The storage room in the basement of a dwelling should not be used, as the odor of the cabbage will penetrate through the house.

For information on the storage of cabbage on a large scale, see Circular 252, Commercial Cabbage Culture.

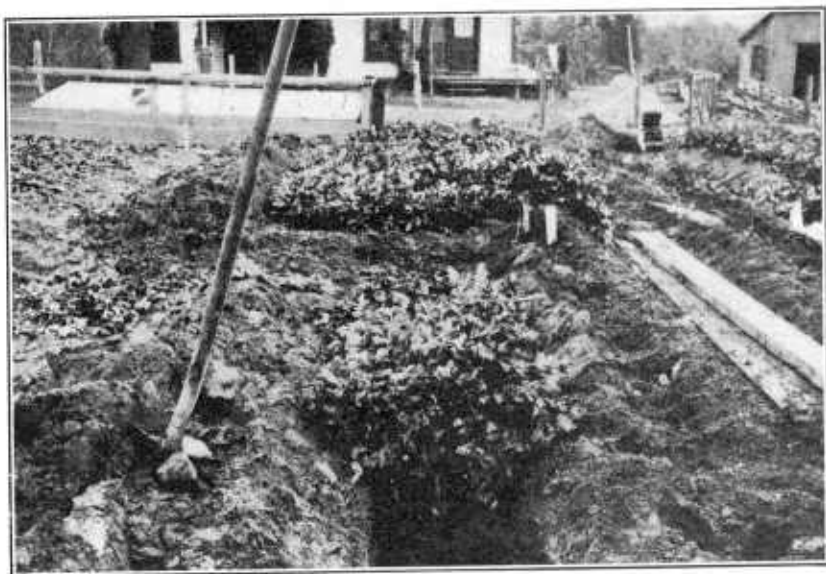
#### CARROTS.

Carrots may be stored in a storage room in the basement, in outdoor storage cellars, or in banks or pits, and are handled in the same way as beets. It is advisable to place a small quantity in the storage room in the basement or in the storage cellar and the remainder in banks or pits. They are not injured by slight freezing; hence they need not be covered as deeply as potatoes. Carrots, like beets, dry out and wilt very rapidly if kept too dry. The atmosphere of the storage space should be kept damp, with a relative humidity of 90 to 95 percent.

## LATE CELERY.

Celery may be stored for a time in the position where grown by placing enough earth around the base of the plants to hold them in good form. Allow them to remain in this condition until just before severe freezing occurs; then bank the earth up to the very tops of the plants, almost covering them, and as the weather becomes colder cover the ridge with coarse manure, straw, or corn fodder held in place by means of stakes or boards. The celery may be removed as needed, but this method is open to the objection that it is hard to get the celery out when the ground is frozen.

Another method of storing celery, illustrated in figure 18, is to excavate a pit 10 to 12 inches wide to a depth of about 24 inches and of any desired length; thoroughly loosen the soil in the bottom or shovel in loose topsoil to form a bed in which to set the roots of the celery, and pack this trench with fully grown plants, placing the roots close together with considerable soil adhering to them. Water the celery as it is placed in the trench and allow the trench to remain open long enough for the tops to become dry. Unless the soil is very dry at the time of storing or extended warm weather should follow, it will not be necessary to apply more water. Place a 12-inch board on edge along one side of the trench and bank it with the surplus earth; cover the trench with a roof of boards, straw on poles, or cornstalks from which the tops have been removed, placing



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FIG. 18.—Celery stored in trenches. A 12-inch board is placed on edge along one side of the trench and cornstalks across it, so that one end of the cornstalks rests on the board and the other on the ground.



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FIG. 19.—Cross section of hotbed pit used for the storage of celery on a small scale.

the stalks across the pit with one end resting on the board and the other on the ground; spread over this a light covering of straw or other material which will pack closely, and as the weather becomes colder increase the covering to keep out the frost. Celery stored in this manner will keep until late in the winter. This method, because of its simplicity, is recommended for the farmer and small grower.

The unused pit of a permanent hotbed may be utilized as a storage place for celery by removing the surplus earth and substituting a covering of boards for the sash. Store the celery in the same manner as in the trench, and cover the bed with any material which will keep out frost. Figure 19 shows a hotbed used for this purpose.

Celery may be stored on the floor of a storage room in the basement of a dwelling or in an outdoor storage cellar. Take up the plants just before freezing occurs, with considerable earth adhering, and set them on the floor with the roots packed together as closely as possible. If moderately moist, the celery will keep well under the conditions found in most storage cellars. Celery should not be stored in the same cellar as turnips or cabbage, as it will absorb the odor of these vegetables, ruining its flavor.

**ONIONS.**

To keep well, onions must be mature and thoroughly dry. Put them in ventilated barrels, baskets, crates, or loosely woven bags, as good ventilation is essential to the keeping of onions. A dry, well-ventilated place, such as an attic, furnishes a good storage space for onions, as slight freezing does not injure them, provided they are not handled while frozen.

For further information regarding the storage of onions, see Farmers' Bulletin 354, entitled "Onion Culture."

**PARSNIPS.**

Parsnips may be allowed to remain in the ground and dug as needed, as freezing does not injure them. However, as it is a difficult matter to dig them when the ground is frozen, it is advisable to store a small quantity in the storage room in the basement of the dwelling or in the outdoor storage cellar for use during the periods when the ground is frozen. Parsnips may be stored in the same manner as beets and carrots.

**POTATOES, IRISH.**

The Irish potato is the most important vegetable in the northern portions of the United States and is stored in large quantities for winter use. It may be kept in the storage room in the basement, in outdoor storage cellars, and in banks or pits. When stored in cellars, the potatoes may be put into barrels, boxes, baskets, crates, bins, or on the floor, but must be protected from the light. When stored in banks or pits they are handled in the same way as beets, carrots, etc. Potatoes must be protected from freezing, and before winter sets in the pit must be covered with manure, straw, or other material in addition to several inches of earth. It is a good plan to place the major portion of the crop in banks or pits and a small quantity in the storage room in the basement or in the outdoor storage cellar for immediate use. A good type of storage cellar especially designed for potatoes is shown in figure 20.

For more detailed information on the storage of potatoes, read Farmers' Bulletin 847, entitled "Potato Storage and Storage Houses."

**POTATOES, SWEET.**

Sweet potatoes should be mature when dug and should be left exposed for a few hours to dry off the surface moisture before being placed in storage. They should be handled carefully at all times, as they are bruised easily. This crop may be kept in pits or banks

or in outdoor storage cellars of the type shown in figure 5, but a warm, dry place is preferable. When stored in pits or banks sweet potatoes are handled in much the same way as beets or other root crops. When kept in a specially constructed storage house, either in bulk or in crates, the potatoes should be cured for about 10 days or two weeks at a temperature of 80° to 85° F. After the curing period the temperature should be reduced gradually to about 53° F. and maintained at that point or as near it as practicable for the remainder of the storage period. When well matured before digging,



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FIG. 20.—A small storage cellar, suitable for holding the products of a home vegetable garden. It is of concrete, is built partly under ground to make it frost proof, and has a small frame entrance.

carefully handled, well cured, and held at a uniform temperature of about 53° F., sweet potatoes may be kept throughout the winter and spring. When only a few bushels of sweet potatoes are to be stored, they may be placed in the basement near the furnace, on a shelf near the kitchen stove, near the chimney on the second floor, or even in the attic.

For more detailed information on the storage of sweet potatoes, read Farmers' Bulletin 1442, entitled "Storage of Sweet Potatoes."

#### PUMPKINS AND SQUASHES.

Pumpkins and squashes may be kept for winter use in the storage room in the basement or in dry, well-ventilated cellars, but a dry, aboveground, frostproof place is best. Put them in rows on shelves so that they are not in contact with each other. If the temperature is maintained at about 50° F., late-maturing varieties of these vegetables will keep until late in the winter.

**SALSIFY.**

Salsify may be stored in the same way as beets, carrots, and parsnips.

**LATE TURNIPS.**

Turnips will withstand hard frost, but alternate freezing and thawing injures them. Gather, top, and store the roots in banks or pits, or in an outdoor storage cellar. Do not place them in the storage room in the basement of the dwelling, as they give off odors that penetrate throughout the house.

**STORAGE OF APPLES.**

Apples may be kept in the storage room in the basement of the dwelling, in outdoor storage cellars, and in banks or pits. Conditions suitable for the keeping of potatoes answer fairly well for apples. Under some conditions it will be an advantage to store part of the crop in the cellar and the late-keeping varieties suitable for spring use in outdoor banks or pits. Do not store apples with potatoes or most other root vegetables, as the apples will absorb an unpleasant flavor.



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